



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,988	09/09/2003	David E. Daws	4865-162	4219
7590	07/14/2006		EXAMINER	
RICHARD E. STANLEY, JR. BRINKS HOFER GILSON & LIONE P.O. BOX 10395 CHICAGO, IL 60610			ZERVIGON, RUDY	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 07/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/658,988	DAWS ET AL.	
	Examiner Rudy Zervigon	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 13 June 2006.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 24-27 and 29-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 24-27 and 29-42 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 09 September 2003 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                     | Paper No(s)/Mail Date. _____ .  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____ .                                  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 13, 2006 has been entered.

### ***Claim Rejections - 35 USC § 112***

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 32, 33, 36, 37, 39, 42, and 44 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicant's specification cites "base plate", "floor plate", "support plate", "center plate", ... as such the claimed "plate" in claims 32, 33, 36, 37, 39, and 42 is undetermined.

### ***Claim Rejections - 35 USC § 102***

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 24, 25, 29-35, and 36-39 are rejected under 35 U.S.C. 102(b) as being anticipated by Christin et al. (US 5,904,957 A). Christin teaches a furnace (19, 11a,b; Figure 2) for

densifying a number of porous structures (12; Figure 2; column 5, lines 61-67) stacked adjacent each other in a stack (30; Figure 2; column 6, lines 49-58), wherein the stack (30; Figure 2; column 6, lines 49-58) comprises a center opening region (31; Figure 2) and an outer region (36; Figure 2), the furnace (19, 11a,b; Figure 2) comprising an inlet duct (16; Figure 2), an outlet duct (17; Figure 2), an inlet opening (holes of lowest 15, not labelled; Figure 2) adjacent one end of said center opening region (31; Figure 2) and in communication with said inlet duct (16; Figure 2) and said center opening region (31; Figure 2), and a passageway (volume 34, 36; Figure 2) adjacent said one end and in communication (fluid “communication”) with said inlet duct (16; Figure 2) and said outer region (36; Figure 2), a size of said inlet opening (holes of lowest 15, not labelled; Figure 2) controlling gas flow to said center opening region (31; Figure 2) wherein a predetermined first portion of said gas passes through said inlet opening (holes of lowest 15, not labelled; Figure 2) to said center opening region (31; Figure 2) and a remaining second portion passes through said passageway (volume 34, 36; Figure 2) to said outer region (36; Figure 2), as claimed by claim 24 – Applicant’s claim requirement of “first portion” and “second portion” of the process gas are claim requirements of intended use of the pending apparatus claims.

Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of

performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

Christin further teaches:

- i. The furnace (19, 11a,b; Figure 2) according to claim 24, further comprising a hole (holes of lowest 15, not labelled; Figure 2) receiving said gas from said inlet duct (16; Figure 2), wherein said passageway (volume 34, 36; Figure 2) extends from said hole (holes of lowest 15, not labelled; Figure 2) to said outer region (36; Figure 2), as claimed by claim 25
- ii. The furnace (19, 11a,b; Figure 2) according to claim 24, wherein said first portion is between about 60% to 80% of said gas and said second portion is between about 40% to 20% of said gas – claim 29 – Applicant’s “first portion” and “second portion” is not structural recitation. See above.
- iii. The furnace (19, 11a,b; Figure 2) according to claim 24, wherein said first portion is between about 15% to 35% of said gas and said second portion is between about 85% to 65% of said gas – claim 30 – Applicant’s “first portion” and “second portion” is not structural recitation. See above.
- iv. The furnace (19, 11a,b; Figure 2) according to claim 24, further comprising spacers (33; Figure 2) disposed between adjacent porous structures (12; Figure 2; column 5, lines 61-67) in the stack (30; Figure 2; column 6, lines 49-58) thereby forming open passages (34; column 6, lines 58-67) therebetween, wherein some of one of said first and second portions of said gas passes between said center opening region (31; Figure 2) and said outer region (36; Figure 2) through said open passages, as claimed by claim 31. Applicant’s claim requirement of “first and second portions of said gas” is a claim requirement of intended use of the pending apparatus

claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

v. The furnace (19, 11a,b; Figure 2) according to claim 24, further comprising a plate (26; Figure 2) disposed away from one of the porous structures (12; Figure 2; column 5, lines 61-67) at one end of the stack (30; Figure 2; column 6, lines 49-58) thereby blocking a portion of said first portion of gas from passing out of said center opening region (31; Figure 2) at said end and thereby forming an open passage (holes in 26, not labelled; Figure 2) therebetween wherein some of said gas passes between said center opening region (31; Figure 2) and said outer region (36; Figure 2) through said open passage (holes in 26, not labelled; Figure 2), as claimed by claim 32

vi. The furnace (19, 11a,b; Figure 2) according to claim 24, further comprising a plate (26; Figure 2) disposed at one end of the stack (30; Figure 2; column 6, lines 49-58) of porous structures (12; Figure 2; column 5, lines 61-67) thereby blocking most of said first portion of gas from passing out of said center opening region (31; Figure 2) at said end, said plate (26; Figure 2) comprising at least one hole (not labelled; Figure 2) adjacent said center opening region (31; Figure 2) and extending therethrough, wherein at least some of said gas passes out of

said center opening region (31; Figure 2) at said end through said hole (not labelled; Figure 2), as claimed by claim 33

vii. The furnace (19, 11a,b; Figure 2) according to claim 24, further comprising a cap (26; Figure 2) disposed at one end of the stack (30; Figure 2; column 6, lines 49-58) of porous structures (12; Figure 2; column 5, lines 61-67) and extending partially into said center opening region (31; Figure 2) thereby blocking most of said first portion of gas from passing out of said center opening region (31; Figure 2) at said end, said cap (26; Figure 2) comprising at least one longitudinal hole (not labelled; Figure 2), wherein at least some of said gas passes out of said center opening region (31; Figure 2) at said end through said longitudinal hole (not labelled; Figure 2), as claimed by claim 34

viii. The furnace (19, 11a,b; Figure 2) according to claim 24, further comprising a plate (26; Figure 2) disposed at one end of the stack (30; Figure 2; column 6, lines 49-58), wherein said plate (26; Figure 2) comprises an exit hole (not labelled; Figure 2) adjacent said center opening region (31; Figure 2), said plate (26; Figure 2) blocking said outer region (36; Figure 2) whereby substantially all of said second portion of gas passes through one or more of said exit holes (not labelled; Figure 2), as claimed by claim 36

ix. The furnace (19, 11a,b; Figure 2) according to claim 24, further comprising a hole (holes of lowest 15, not labelled; Figure 2) receiving said gas from said inlet duct (16; Figure 2), wherein said passageway (volume 34, 36; Figure 2) extends from said hole (holes of lowest 15, not labelled; Figure 2) to said outer region (36; Figure 2), and a distributor (25; Figure 2), wherein said hole (holes of lowest 15, not labelled; Figure 2) and said passageway (volume 34, 36; Figure 2) extend through said distributor (25; Figure 2), said hole (holes of lowest 15, not

labelled; Figure 2) being in communication with said inlet opening (holes of lowest 15, not labelled; Figure 2), wherein said distributor (25; Figure 2) is disposed between a floor plate (11a; Figure 2) of the furnace (19, 11a,b; Figure 2) and a base plate (15a; Figure 2) supporting the stack (30; Figure 2; column 6, lines 49-58), and wherein said passageway (volume 34, 36; Figure 2) passes said second portion to a space between said floor plate (11a; Figure 2) and said base plate (15a; Figure 2); wherein said first portion is between about 60% to 80% of said gas and said second portion is between about 40% to 20% of said gas (“first portion”, “second portion”; see above); and further comprising spacers (33; Figure 2) disposed between adjacent porous structures (12; Figure 2; column 5, lines 61-67) in the stack (30; Figure 2; column 6, lines 49-58) thereby forming open passages (34; column 6, lines 58-67) therebetween, wherein some of said gas passes from said center opening region (31; Figure 2) to said outer region (36; Figure 2) through said open passages – claim 38

x. The furnace (19, 11a,b; Figure 2) according to claim 38, further comprising a plate (26; Figure 2) disposed away from one of the porous structures (12; Figure 2; column 5, lines 61-67) at one end of the stack (30; Figure 2; column 6, lines 49-58) thereby blocking a portion of said first portion of gas from passing out of said center opening region (31; Figure 2) at said end and thereby forming an open passage (holes in 26, not labelled; Figure 2) therebetween wherein some of said first portion of gas passes from said center opening region (31; Figure 2) to said outer region (36; Figure 2) through said open passage (holes in 26, not labelled; Figure 2), as claimed by claim 39

***Claim Rejections - 35 USC § 103***

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
7. Claim 37, 41, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christin et al. (US 5,904,957 A). Christin is discussed above. Christin further teaches:
  - i. The furnace (19, 11a,b; Figure 2) according to claim 24, further comprising a plate (26; Figure 2) disposed at one end of the stack (30; Figure 2; column 6, lines 49-58), wherein said plate (26; Figure 2) comprises an exit hole (not labelled; Figure 2) adjacent said center opening region (31; Figure 2) – claim 37
  - ii. The furnace (19, 11a,b; Figure 2) according to claim 41, further comprising a plate (26; Figure 2) disposed away from one of the porous structures (12; Figure 2; column 5, lines 61-67) at one end of the stack (30; Figure 2; column 6, lines 49-58) thereby blocking most of said first portion of gas from passing out of said center opening region (31; Figure 2) at said end and thereby forming an open passage (holes in 26, not labelled; Figure 2) therebetween wherein some of said gas passes from said center opening region (31; Figure 2) to said outer region (36; Figure 2) through said open passage (holes in 26, not labelled; Figure 2); said plate (26; Figure 2) comprising at least one hole (not labelled; Figure 2) adjacent said center opening region (31; Figure 2) and extending therethrough, wherein at least some of said gas passes out of said center opening region (31; Figure 2) at said end through said hole (holes of lowest 15, not labelled; Figure 2) – as claimed by claim 42

Christin does not teach:

- i. a smaller hole away from said exit hole (not labelled; Figure 2), said plate (26; Figure 2) blocking said outer region (36; Figure 2) whereby most of said second portion of gas passes through one or more of said exit holes (not labelled; Figure 2) and at least some of said second portion passes through one or more of said smaller holes (11a/16 interface; Figure 2) – claim 37
- ii. The furnace (19, 11a,b; Figure 2) according to claim 24, further comprising a hole (holes of lowest 15, not labelled; Figure 2) receiving said gas from said inlet duct (16; Figure 2), wherein said passageway (volume 34, 36; Figure 2) extends from said hole (holes of lowest 15, not labelled; Figure 2) to said outer region (36; Figure 2); and a base plate (15a; Figure 2) supporting the stack (30; Figure 2; column 6, lines 49-58), wherein said inlet opening (holes of lowest 15, not labelled; Figure 2) extends through said base plate (15a; Figure 2), said inlet opening (holes of lowest 15, not labelled; Figure 2) comprising said hole (holes of lowest 15, not labelled; Figure 2) and a smaller, upper hole is a larger, lower hole, wherein said passageway (volume 34, 36; Figure 2) extends through said base plate (15a; Figure 2) to an outer edge of said base plate (15a; Figure 2); wherein said first portion is between about 60% to 80% of said gas and said second portion is between about 40% to 20% of said gas; and further comprising spacers (33; Figure 2) disposed between adjacent porous structures (12; Figure 2; column 5, lines 61-67) in the stack (30; Figure 2; column 6, lines 49-58) thereby forming open passages (holes in 26, not labelled; Figure 2) therebetween, wherein some of said first portion of gas passes from said center opening region (31; Figure 2) to said outer region (36; Figure 2) through said open passages (holes in 26, not labelled; Figure 2), as claimed by claim 41  
It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the relative size of Christin's hole dimensions to "smaller" or "larger" holes.

Motivation to optimize the relative size of Christin's hole dimensions to "smaller" or "larger" holes is for controlling flow characteristics of Christin's apparatus as taught by Christin (column 1; lines 28-40). It is well established that changes in apparatus dimensions are within the level of ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

8. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Christin et al. (US 5,904,957 A) in view of Porter; Cole D. et al. (US 5,626,680 A). Christin is discussed above. Christin does not teach the furnace (19, 11a,b; Figure 2) according to claim 34, further comprising a thermocouple wire installed through said longitudinal hole (not labelled; Figure 2) and extending through said center opening region (31; Figure 2), said thermocouple wire being connected to a thermocouple embedded in a sample porous structure, as claimed by claim 35. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Porter's thermocouple embedded wafer to Christin's apparatus.

Motivation to add Porter's thermocouple embedded wafer is for determining the "maximum acceptable stress limit to which a wafer can be exposed" as taught by Porter (column 6, lines 40-48)

9. Claim 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christin et al. (US 5,904,957 A) in view of Liu; Jingbao et al. (US 6,403,491 B1) and Porter; Cole D. et al. (US 5,626,680 A). Christin is discussed above. Christin does not teach:

i. The furnace (19, 11a,b; Figure 2) according to claim 39, further comprising a cap disposed at one end of the stack (30; Figure 2; column 6, lines 49-58) of porous structures (12; Figure 2; column 5, lines 61-67) and extending partially into said center opening region (31; Figure 2) thereby blocking most of said first portion of gas from passing out of said center opening region (31; Figure 2) at said end, said cap comprising at least one longitudinal hole (not labelled; Figure 2), wherein at least some of said gas passes out of said center opening region (31; Figure 2) at said end through said longitudinal hole (not labelled; Figure 2); and a thermocouple wire installed through said longitudinal hole (not labelled; Figure 2) and extending through said center opening region (31; Figure 2), said thermocouple wire being connected to a thermocouple embedded in a sample porous structure, as claimed by claim 40

Liu teaches a cap (350a; Figure 4) for controlling gas flow in Liu's apparatus.

Porter teaches a thermocouple (96, 98; Figure 11; column 6, lines 24-30) embedded wafer (94; Figure 11).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Liu's cap and Porter's thermocouple embedded wafer to Christin's apparatus.

Motivation to add Liu's cap is to facilitate process gas distribution as taught by Liu (column 14; lines 22-34). Motivation to add Porter's thermocouple embedded wafer is for determining the "maximum acceptable stress limit to which a wafer can be exposed" as taught by Porter (column 6, lines 40-48)

10. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Christin et al. (US 5,904,957 A) in view of Murugesh; Laxman et al. (US 6,450,117 B1). Christin is discussed above. Christin does not teach Christin's distributor (25; Figure 2) having a radial hole

passageway. Murugesh teaches a similar reactor (30; Figure 3) with a gas distributor (65; column 3; lines 41-55).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Christin's distributor (25; Figure 2) with Murugesh's distributor (65; column 3; lines 41-55).

Motivation to replace Christin's distributor (25; Figure 2) with Murugesh's distributor (65; column 3; lines 41-55) is for controlling the location of process gas injection within reactors as taught by Murugesh (column 7, line 65 – column 8, line 7).

#### *Response to Arguments*

11. Applicant's arguments filed June 13, 2006 have been fully considered but they are not persuasive.
12. Applicant disagrees with the Examiner's interpretation of the Christin et al. (US 5,904,957 A) invention because in "Christin et al. all of the gas passes to the center opening region". The Examiner disagrees. Christin's center opening region (31; Figure 2) is not the sole path, as provided by Christin's reactor structure for gases traversing from 16 to 17; Figure 2 – Specifically, see lateral flows through openings 34, Figure 2.

#### *Conclusion*

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to

Art Unit: 1763

the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

*Rufi Geagan*  
3/06